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F2B BD

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(58) Documents Cited

GB 2176817 A

Trade Pamphlet-Conder Tanks, published 1989

(58) Field of Search

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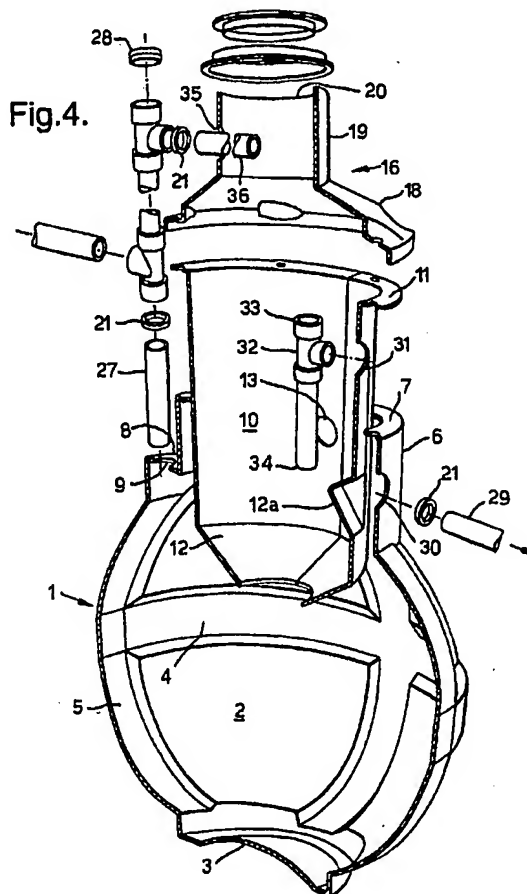
DPMX DPPA, E1C C10 C5

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5/10 5/14 5/18 11/00

## (54) Gravity separator

(57) A gravity separator, used as a septic tank or to recover oil from a car park run off water, comprises a one-piece bulbous body 2 with a integral neck 6, rotationally moulded from polyethylene or GRP, the neck terminating in an intumed flange 7 which supports the upper flange 11 of an annular baffle 10 depending into the body. Inlet 27, outlet 29 and air vent 36 pipes are sealed through holes in the body, neck and neck extension 16 using grommets 21 (Fig. 2).



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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

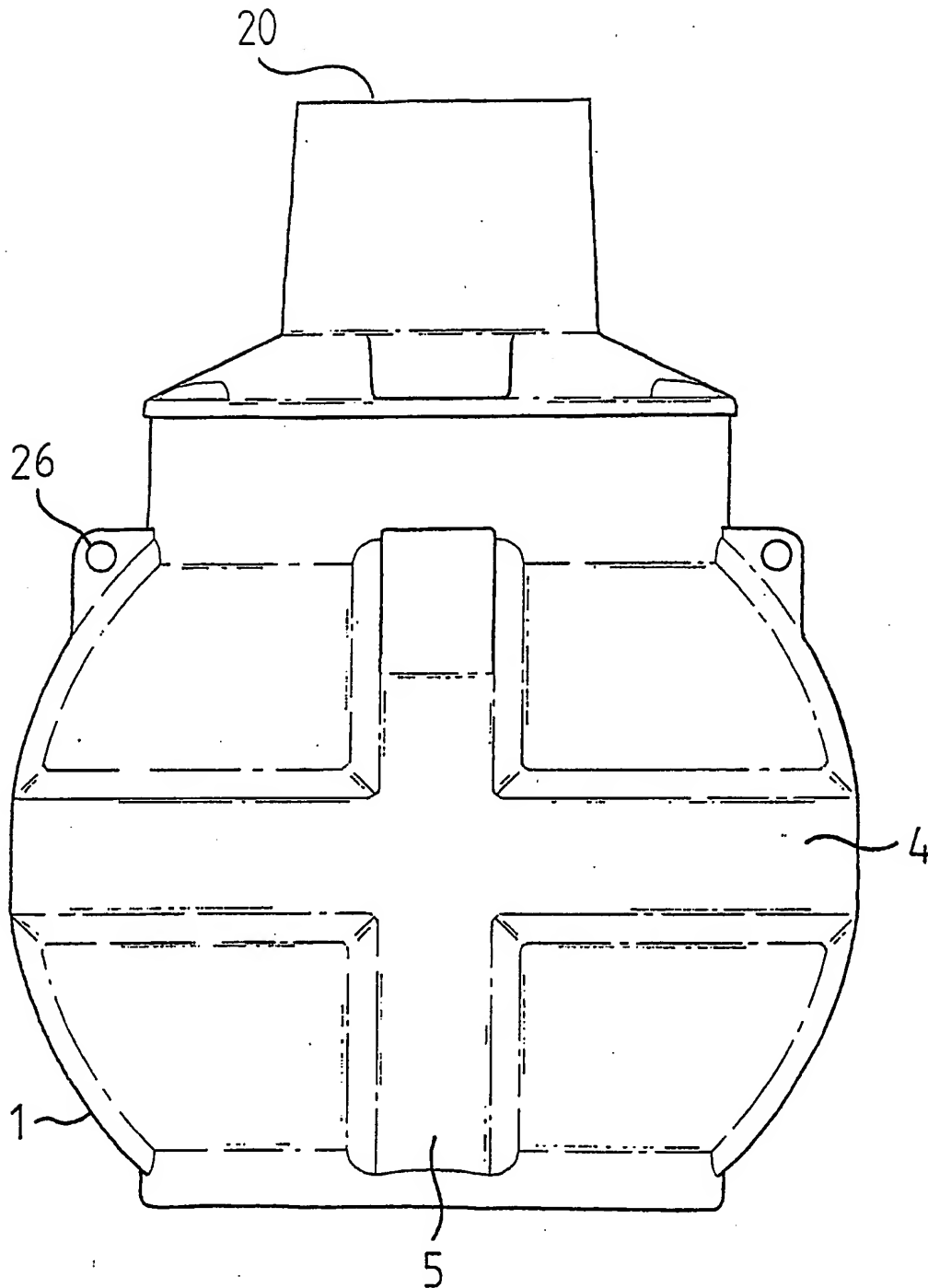


Fig. 1

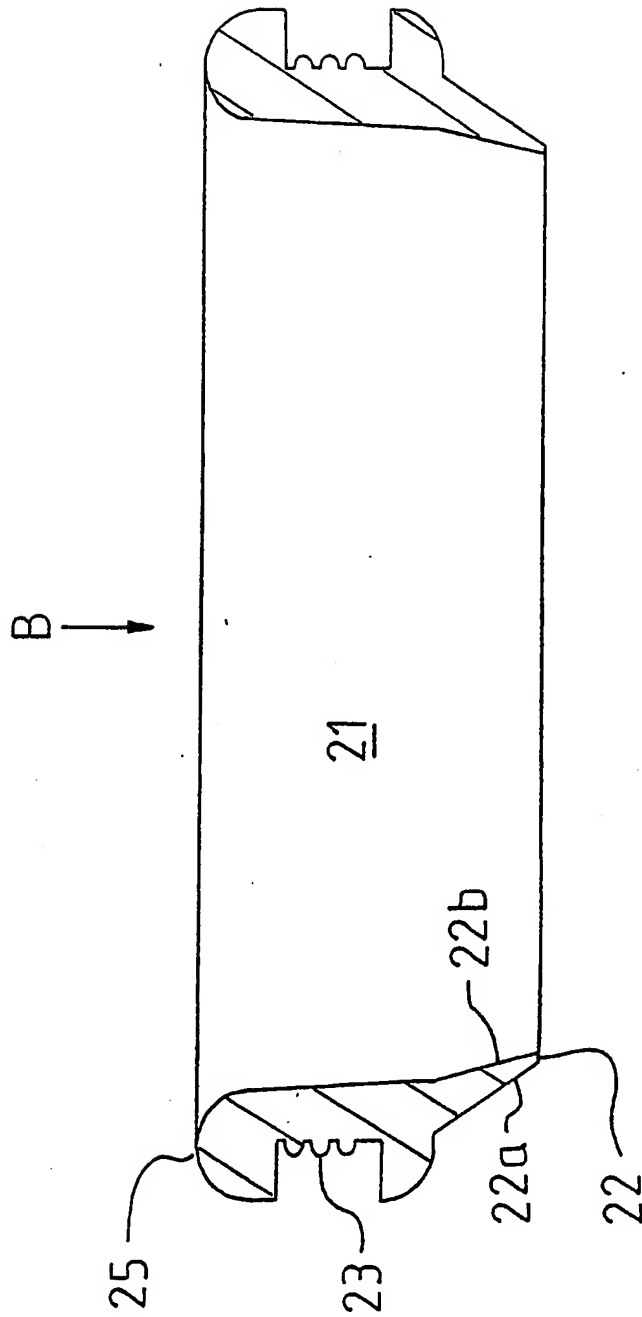


Fig. 2

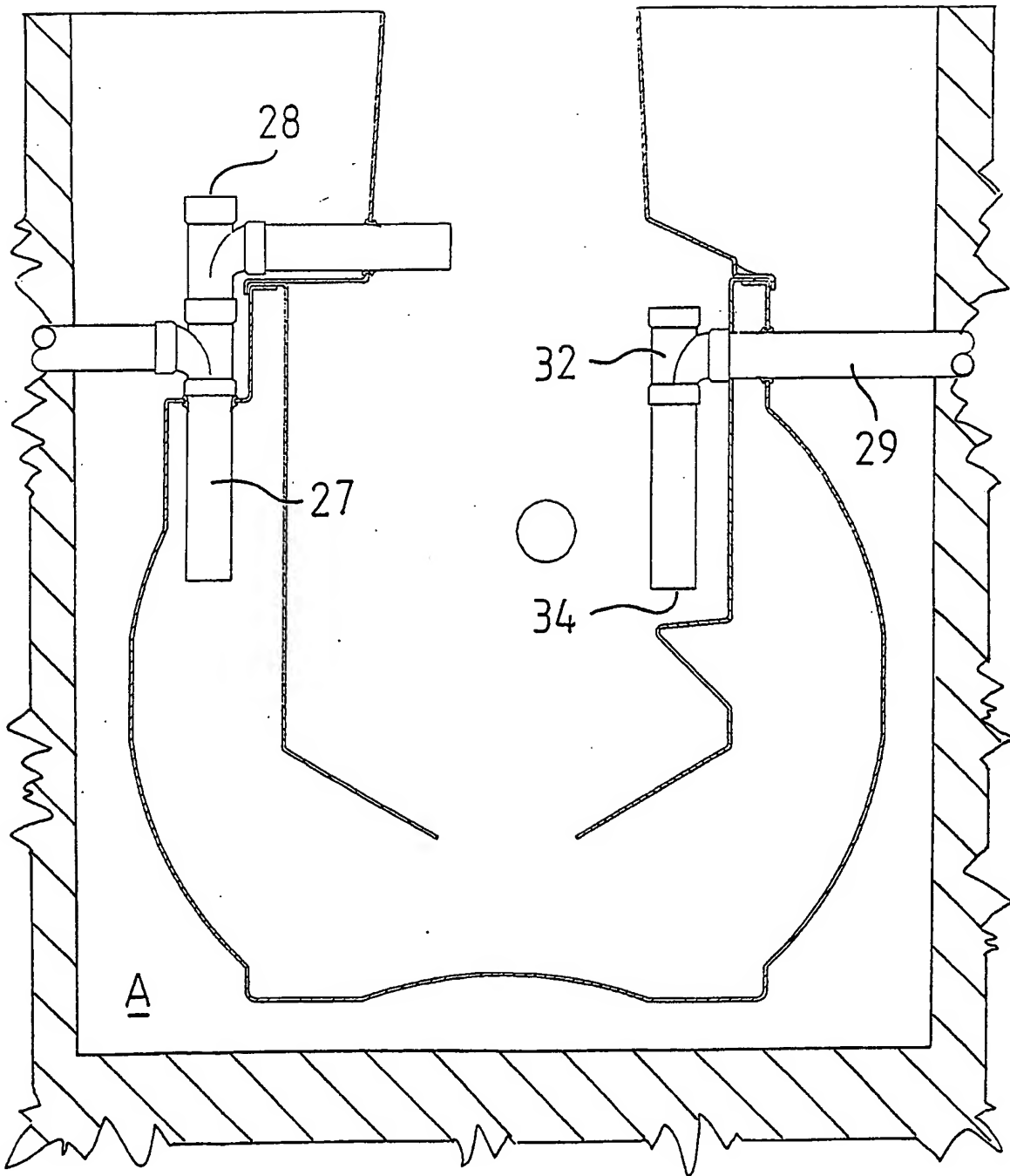
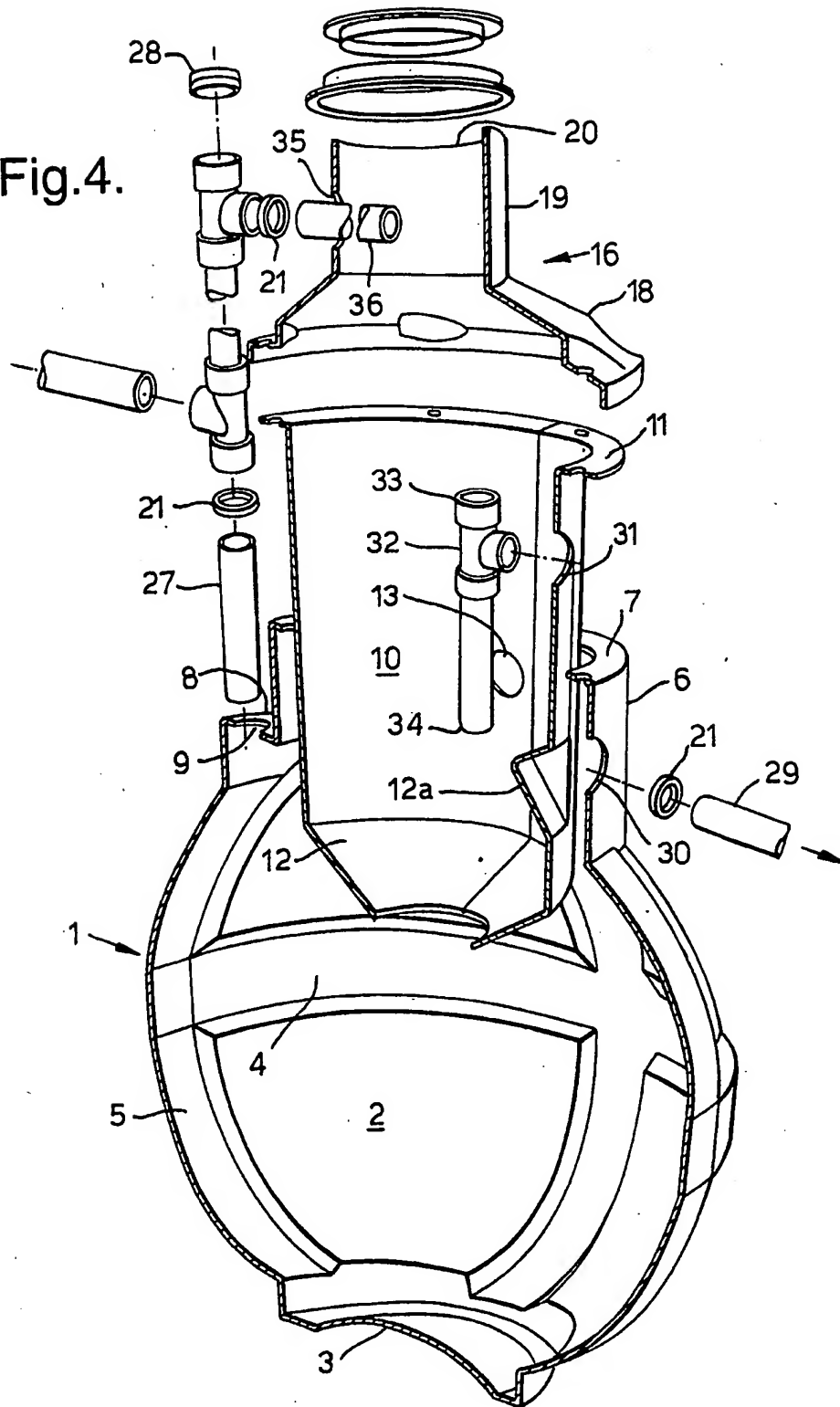


Fig. 3

Fig.4.



SEPARATOR

This invention relates to separators such as septic tanks.

According to the invention there is provided a separator, for example for separating oil and water in run-off, comprising a neck extending from a bulbous body, the apparatus further comprising a baffle depending by a flange from the neck.

Because the baffle depends by a flange it is easily assembled by lowering the baffle into position. Similarly in the event servicing is required the baffle is readily withdrawn. In many prior art devices the baffle extends substantially across the widest portion of the body and cannot be assembled or disassembled in this. In addition to the advantage of more ready assembly and disassembly the "narrow" baffle allows a peripheral body seam to be dispensed with and reduces the likelihood of leakage.

According to another aspect of the invention there is provided a resilient grommet for sealing a pipe to a separator. The grommet is provided with an outer peripheral groove for receiving a hole in the separator, the groove side walls exerting axial forces on the separator. The grommet has a bore for receiving the pipe the bore exerting a radial force on the pipe. Preferably an end of the grommet bore is provided with an inwardly

directed land.

An embodiment of the invention will be described by reference to the accompanying figures of which:

Figure 1 is a side elevation;

Figure 2 is a cross sectional view of a grommet;

Figure 3 is a sectional view; and

Figure 4 is an exploded sectional view.

The tank 1 comprises a body 2 of generally spherical form. Body 2 is conveniently made of PE but those skilled will have little difficulty in devising tanks of other materials. The base of the tank is provided with a punt 3 which facilitates production and also serves both to strengthen the body and to facilitate draining. Equatorial and polar ribs 4,5 are formed into the body 2 to increase rigidity.

Body 2 is provided with a neck 6 formed generally diametrically opposite the punt 3. The top of the neck 6 is provided with an inwardly directed flange 7. A planar face 8 parallel to flange provided with an inlet 9 is provided to one side of the neck 6.

The tank is provided with a baffle 10. Baffle 10 is a generally cylindrical member. It is provided with an external flange 11 at one end. When assembled the baffle 10 is received within the body 2 with external flange 11 supported on internal flange 7. The other end 12 of the baffle is frustoconical. The small diameter of

the frustoconical portion depends away from the external flange 11 and toward the punt 3.

Partway along the cylindrical portion of the baffle 10 there are provided one or more protrusions 12a. In the embodiment shown the protrusions are moulded into the cylindrical portion of the baffle 10. It will be apparent that the protrusions may be applied to the inside wall. It is preferred that the protrusions be angular. In order to comply with BS 6297 (1983) the baffle is of such a size that its volume is at least one third the total working capacity of the tank. It is possible to modify the relative volumes so as to comply with local regulations. One or more circulation holes 13 may be provided in the cylindrical portion of the baffle 10.

The neck extension 16 is received by flange 7. Neck extension 16 comprises two frustoconical regions 18,19. The first 18 nearer the flange 7 is directed inwardly so as to markedly reduce the diameter of the extension. The second 19 is more nearly parallel than the first and terminates at circular opening 20.

The tank of the invention may readily be installed. A cavity A is dug in the ground and optionally lined with gravel or concrete in conventional manner. The body 2 is placed in the cavity A for example by slinging from strong points 26. The cavity is



partially back filled for example in known manner. It may be necessary to fill partially the body 2 of the tank to reduce the forces tending to deform it.

In preferred embodiments the tank is assembled and supplied ready to be lowered into the cavity. If preferred however, it may be supplied as a kit for assembly in situ.

An inlet pipe 27 is fitted to inlet port 9 and subsequently connected to a sewerage supply (not shown). The inlet pipe and/or the outlet pipe and/or the air vent pipe (to be described hereinafter) may be fitted to the respective port by a grommet 21. Grommet 21 is conveniently of an elastic material such as rubber. The grommet is generally annular having a bore about that of the pipe.

A lip 22 directed inwardly and towards one end of the grommet. Lip 22 serves two functions. The outer tapered portion 22a allows ready insertion into its port. The inwardly directed portion 22b grips the pipe and forms a good seal. Insertion in direction B is facilitated and removal or seepage in the reverse direction inhibited. A ribbed land 23 is provided around the outer circumference of the grommet. In use the land cooperates with the port to form a tight seal. The thickened outer edge reduces the likelihood of the grommet being dislodged for example, on insertion of the

pipe.

If desired rodding access may be permitted through a rodding eye 28. Gas escape is allowed by venting through a vent (not shown) typically remote from the tank and carried on a stack.

An exit pipe 29 is led through exit ports 30,31 formed in the body and the baffle. A tee piece 32 is fitted to the end of the exit pipe extending into the baffle. One end 33 of the tee piece 32 extends upwardly to allow air circulation from the system downstream of the tank. The other end 34 of the tee piece 32 extends downwardly and terminates just above protrusions 12,12a. The other end of the exit pipe 29 generally leads to a conventional soak-away not shown.

The tank may be vented through air vent port 35 in the neck extension. An air vent pipe 36 leads from the second frustoconical portion 19 to the gas escape vent as herein before described. After insertion in the cavity the remaining parts of the tank can then be assembled and the cavity back filled. The arrangement of the tank is such that assembly may be carried out without internal access to the tank. If desired however an assembler may of course enter the tank.

In use sewage enters the tank through inlet pipe 27. Because the pipe is downwardly directed the possibility of choking by solid is reduced. Digestion

occurs in the tank and solid matter settles out falling toward the punt 3. Contained liquid follows a tortuous path and eventually reaches the exit port. Because of the arrangement of the ports and baffle retention time in the tank is long and there is little possibility of undigested matter existing in the tank.

Gas is generated in almost all digestion processes. That generated in the tank of the invention may readily escape through ports provided with little danger of gas build-up.

It is generally necessary to pump-out septic tanks after a period of use so as to remove accumulated sediment at the bottom. To do this the top of the tank is removed and a drain pipe inserted. The frustoconical end to the baffle guides the drain to the punt 3. Suction can then be applied to empty the tank.

Those skilled in the art will readily be able to devise modifications. In particular it is by no means essential that the tank be formed of PE. Other materials such as GRP will be readily usable. Furthermore, in the specific embodiment hereinbefore described the baffle has a frustoconical portion. This is by no means essential. The baffle can have other arrangements at the lower end and may terminate in a perforated plate perpendicular to the baffle side walls or the base of the baffle may simply be open. It is

also not essential that the baffle be of cylindrical form. It is preferred that in situ the side walls of the baffle be substantially vertical to minimise aggregation of sediment on the walls. Almost any cross-section such as square or hexagonal may be adopted for the baffle. More than one invention may be disclosed herein. It will be appreciated that any inventive feature or combination of features form patentable subject matter of the invention. It is not necessarily intended that the invention be restricted to tanks having all of the features described.

In prior art tanks it has been necessary to provide more than one baffle to reduce the possibility of undigested material existing the tank. The invention provides a simple and effective tank. Furthermore prior art tanks are liable to build up of sediment. Some tend to be difficult to pump out. In others substantial shelf portions are provided which readily collect sediment which is difficult to reach when pumping out. The baffle is as previously described suspended by a flange. This arrangement allows convenient assembly and allows sediment to settle evenly in the base of the tank. The grommet arrangement disclosed seals radially and allows use with a range of wall thickness.

Although the invention has been described be reference to a septic tank it will be apparent that the

invention has use in other separations and storages. By way of non-limiting example rain running off car parks roads and runways is often highly contaminated by hydrocarbon residues. The run off can be purified to a considerable extent by allowing it to settle. The hydrocarbon residues tend to rise to the top and the two phases can then be separated and disposed of.

CLAIMS

1. A separator comprising a neck extending from a bulbous body the apparatus further comprising a baffle removably depending by a flange from the neck.
2. A separator as claimed in claim 1 wherein the body is a one piece moulding.
3. A separator as claimed in claim 2, wherein the neck is formed integrally with the body.
4. A separator as claimed in claim 1 or 2 wherein the baffle is generally cylindrical.
5. A separator as claimed in claim 3, wherein the baffle terminates in a truncated core.
6. A separator as claimed in any one of the preceding claims wherein a neck extension is received on the flange.
7. A separator as claimed in any one of the preceding claims wherein at least one of the neck, body and baffle are rotationally moulded from the polyethylene.
8. A separator substantially as described herein by reference to any one or more of the figures.

**Patents Act 1977**  
**Examiner's report to the Comptroller under Section 17**  
**(The Search report)**

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GB 9411046.7

**Relevant Technical Fields**

(i) UK Cl (Ed.M) B1D (DNFB, DPAC, DPFE, DPGC, DPMX, DPPA) E1C (C5, C10)

(ii) Int Cl (Ed.5) B01D (17025, 21/00, 21/02); C02F 3/28; E03F (5/10, 5/14, 5/18, 11/00)

**Databases (see below)**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Search Examiner  
R T HAINES

Date of completion of Search  
23 JUNE 1994

Documents considered relevant following a search in respect of Claims :-  
1-8

**Categories of documents**

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|---|---|
| <b>X:</b> Document indicating lack of novelty or of inventive step.   | <b>P:</b> Document published on or after the declared priority date but before the filing date of the present application.        |
| <b>Y:</b> Document indicating lack of inventive step if combined with one or more other documents of the same category. | <b>E:</b> Patent document published on or after, but with priority date earlier than, the filing date of the present application. |
| <b>A:</b> Document indicating technological background and/or state of the art.   | <b>&amp;:</b> Member of the same patent family; corresponding document.   |

Category	Identity of document and relevant passages	Relevant to claim(s)
X,Y	GB 2176817 A	X: 1-4,6 Y: 7
Y	TRADE PAMPHLET - CONDER TANKS published 1989	7

**Databases:** The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).